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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/598,678	09/07/2006	Ulf Skarby	2380-1174	8758
23117 7590 01/19/2011 NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203				
EXAMINER				
AKINYEMI, AJIBOLA A				
ART UNIT		PAPER NUMBER		
2618				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/598,678

Applicant(s)

SKARBY ET AL.

Examiner

AJIBOLA AKINYEMI

Art Unit

2618

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 October 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 17-29 and 31-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 17-29 and 31-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09/07/2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a). Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-946)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/29/2010 has been entered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 17-21, 24, 25, 28, 31 are rejected under 35 U.S.C. 102(b) as being anticipated by Gordon (Patent No.: US 5067173).

With respect to claim 17:

Gordon discloses a method comprising: at a receiver diversity antenna arrangement that comprises at least two antennas that are spaced apart (**fig.2, item 116, 114**) and/or that have different polarizations, each antenna receiving a radio frequency (RF) signal transmitted from the same transmitter (**signal coming into item 114, 116 from a transmitter**), where each RF signal received at each of the spaced apart antennas is at

the same frequency and carries the same information (**fig.2, signal coming into item 114, 116 carry the same information**); converting one or more received antenna signals into a corresponding number of different frequency signals by mixing with a first set of a corresponding number of reference signals (**fig.2, item 116 is been shifted by reference frequency 206 to produce signal 207**), where the one or more converted antenna signals is converted to a non-used frequency not used by the other received signals (**fig.2, item 114 is been converted to non used frequency**) forwarding the diversity signals received on all the antennas of the receiver diversity antenna arrangement of which one or more of the received diversity signals have been frequency converted to the non-used frequency and provided to a radio base station on a single feeder such that a number of feeders required between the radio base station and the receiver diversity antenna arrangement is reduced (**fig.2, item 209 is where the two signals are combined together on a single feeder and forwarded to base station 100**); and diversity processing two or more of the forwarded diversity signals to obtain a single enhanced received signal corresponding to the transmitted signal (**fig.2, item 213 shows a single enhanced received signal**).

With respect to claim 18:

Gordon discloses a method wherein the diversity antenna arrangement comprises n antennas, said method comprising the steps of converting all received antenna signals except one, and forwarding the non-converted antenna signal together with all frequency-converted signals to the radio base station on the single feeder, thus providing n-way diversity with a single feeder (**fig.2, item 116 is the converted**

antenna signal at item 205 together with reference frequency 206 and item 114 is the non converted signal and both signal combined at item 209 before forwarding to base station 100).

With respect to claim 19:

Gordon discloses a method wherein the diversity antenna arrangement comprises n antennas, said method comprising the step of converting all received antenna signals and forwarding them to the radio base station on the single feeder, thus providing n-way diversity with a single feeder (**fig.2, item 209 is the combiner or single feeder where both received signal are combined and forward to base station 100).**

With respect to claim 20:

Gordon discloses a method further comprising converting the frequency-converted signals to other frequencies by mixing them with a second set of reference signals in order to obtain another set of frequency-converted signals which are forwarded to the base station on the single feeder (**fig.2, item 205 is the mixer where the received signal is mix with reference frequency 206 in order to obtain 207 which is forwarded to base station 100 through a single feeder 209 in fig. 2).**

With respect to claim 21:

Gordon discloses a method wherein the diversity antenna arrangement comprises a first and a second antenna (**fig.2, item 116 and 114**), said method comprising the steps of converting the antenna signal on the second antenna into an intermediate (IF) signal (**fig.2, item 116 is being converted to IF at item 205 with reference frequency 206**) at the non-used frequency and forwarding the IF signal together with the non-converted

antenna signal on the first antenna to the radio base station on a single feeder, thus providing 2-way diversity with a single feeder (**fig.2, item 116 and 114 are the converted and non converted antenna signal forwarded to base station 100 through a single feeder 213**).

With respect to claim 24:

Gordon discloses a receiver diversity antenna arrangement comprising at least two diversity antennas that are spaced apart and/or that have different polarizations (**fig.2, item 116, 114**), each antenna being adapted for reception of radio frequency (RF) signal transmitted from the same transmitter (**signal coming into item 114, 116 from a transmitter**), where each RF signal is at the same frequency and carries the same information (**fig.2, signal coming into item 114, 116 carry the same information**); one or more frequency converters (**fig.2, item 205**) each adapted to convert a respective antenna signal to a respective different, and non-used frequency signal-by mixing it with a predetermined frequency (**fig.2, discloses two antenna path wherein one is been converted at item 205 with reference frequency 206 and the other antenna 114 is the non used frequency signal**), a combiner for combining the signals received on the antennas (**fig.2, item 209 is the combiner that combined the two signal**), of which signals one or more have been frequency converted (**signal 207 has been frequency converted**) to form a composite signal which is forwarded to a radio base station on a single feeder (**fig.2, item 213**) and a diversity processor (**fig.2, item 201**) for diversity processing two or more of the forwarded diversity signals to obtain a

single enhanced received signal (**fig.2, item 214**) corresponding to the transmitted signal.

With respect to claim 25:

Gordon discloses a receiver diversity antenna arrangement wherein a signal from a diversity antenna follows a diversity branch, the receiver diversity antenna arrangement further comprising providing a frequency converter in each diversity branch except one (**fig.2, item 205 is the frequency converter provided at first branch and no converter in the other branch**).

With respect to claim 28:

Gordon discloses a receiver diversity antenna arrangement wherein there are two diversity antennas (**fig.2, item 116, 114**), one of which is connected to a first duplex filter so as to provide for reception and transmitting (**fig.2, item 211 is a duplex filter**), receiver diversity antenna arrangement further comprising a single frequency converter (**fig.2, item 205**) converting the antenna signal from the second antenna to an-non-used intermediate frequency within a full receiver band to form an IF signal wherein the combiner (**fig.2, item 209**) is configured to combine the original RX signal from the first antenna (**fig.2, output of item 212**) with the IF signal (**fig.2, output if item 208**) into a composite signal (**fig.2, output of item 209 is a composite signal**), and the single feeder (**fig.2, item 213**) is configured to forward the composite signal to the base station (**fig.2, item 100**) thus providing 2-way diversity with one feeder.

With respect to claim 31:

Gordon discloses a radio base station comprising a receiver diversity antenna arrangement according to claim 24 (fig.2, item 100 is the base station with the receiver diversity antenna 116, 114).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claim 22, 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gordon (Patent No.: US 5067173).

With respect to claims 22, 29:

Gordon discloses a method wherein there are two diversity antenna arrangements include first and second antenna in which one is being converted into first intermediate frequency and the other first non used frequency and forwarding the non converted on the first antenna and IF signal on a feeder to the base station (**fig. 2 shows two**

antenna arrangement with signal 114, 116 which are received and 116 is been mixed with reference frequency at 205 and forwarded to base station through a single feeder 209 together with signal 114). Gordon did not disclose third and fourth antenna to convert the signal into second IF and second non used signal but it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the third and fourth antenna since Gordon discloses first and second antenna and having third and fourth antenna will yield the same predictable result as first and second antenna of Gordon.

7. Claim 23, 26, 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gordon (Patent No.: US 5067173) and further in view of Scott (Patent No.: US 5742583).

With respect to claim 23:

The rejection of claim 17 is incorporated; Gordon does not disclose converting, at the radio base station, the frequency-converted signals into other frequency-converted signals, all on the same intermediate frequency by mixing them with a set of reference signals, and subjecting the twice frequency converted signals on the common intermediate frequency to the diversity signal processing. Scott discloses this limitation (fig.4, discloses two antenna with signals that combine at item 182 and subjected to another conversion in item 186 and 187 to get IF at the base station 192 in fig. 4. It would have been obvious to one of ordinary skill in the art at the time the invention was

made to have the above limitation of Scot incorporated into Gordon's invention in order to minimize the number of backhaul cables needed for a plurality of antennas.

With respect to claim 26:

The rejection of claim 24 is incorporated; Scott further discloses a receiver diversity antenna arrangement wherein a signal from a diversity antenna follows a diversity branch (fig.4), receiver diversity antenna arrangement further comprising providing a frequency converter in each diversity branch (fig.4, item 180 and 181 are the frequency converter in each branch).

With respect to claim 27:

The rejection of claim 24 is incorporated; Gordon in combination with Scott further discloses a receiver diversity antenna arrangement wherein a second set of frequency converters are adapted to convert the frequency-converted signals into another set of frequency-converted signals for transport to the radio base station on the single feeder (fig. 4 of Scott discloses frequency converter 186, 187 and a single feeder fig.2, item 213 of Gordon).

8. Claim 32-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gordon (Patent No.: US 5067173) and further in view of Admitted prior art henceforth "Admission)

With respect to claim 32:

The rejection of claim 24 is incorporated; Gordon does not disclose tower mounted unit (TMA). Admission discloses a TMA (fig.1, item 6) via feeder 2. It would have been

obvious to one of ordinary skill in the art at the time the invention was made to have the above limitation of Admission incorporated into Gordon's invention since Gordon discloses a diversity antenna via a single feeder and Admission discloses a tower mounted amplifier. This will help in amplifying the received signal for processing.

With respect to claim 33, 34:

The rejection of claims 17 and 24 are incorporated; Admission further discloses two antennas wherein the two antennas are spaced apart and has different polarization (page 1, lines 12-14).

Response to Arguments

9. Applicant's arguments with respect to claims 17, 24 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AJIBOLA AKINYEMI whose telephone number is (571)270-1846. The examiner can normally be reached on monday- friday (8.30-5pm) Est.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DUC NGUYEN can be reached on (571) 272-7503. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. A./
Examiner, Art Unit 2618

/Duc Nguyen/
Supervisory Patent Examiner, Art Unit 2618